Name: _____ Date: _____

A2CC Q3 Exam 2 Review

THIS REVIEW IS NOT COMPREHENSIVE. BE SURE TO STUDY YOUR NOTES, HOMEWORK ASSIGNMENTS AND OLD TESTS AS WELL!

1. The distance that a person drives at a constant speed varies directly with the amount of time they have been driving. If, at a particular speed, a person drives 107 miles in two hours, then how far will they drive, at the same speed, in $1\frac{1}{4}$ hours?

$\frac{\text{miles}}{\text{hour}}$ $\frac{107}{2} = \frac{x}{1.25}$ $2x = 133.75$

$x = 66.875$ miles

2. Given the function $f(x) = x^2 - 2x + 7$, what is its average rate of change over the interval $3 \le x \le 11$?

(1) 8 (3) −5

(2) 12 (4) −7

$\frac{f(11) - f(3)}{11 - 3} = \frac{106 - 10}{11 - 3} \quad \frac{96}{8} = 12$

$f(11) = 11^2 - 2(11) + 7 = 106$

$f(3) = 3^2 - 2(3) + 7 = 10$

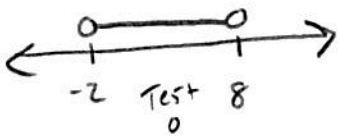
3. Which of the following is the solution set to the inequality $x^2 - 6x - 16 < 0$?

(1) $-2 < x < 8$ (3) $-4 < x < 4$

(2) $x > 8$ (4) $x < -16$

$(x-8)(x+2)$

$x = 8 \quad x = -2$



$0^2 - 6(0) - 16 < 0$

$0 - 0 - 16 < 0$

$-16 < 0$

yes

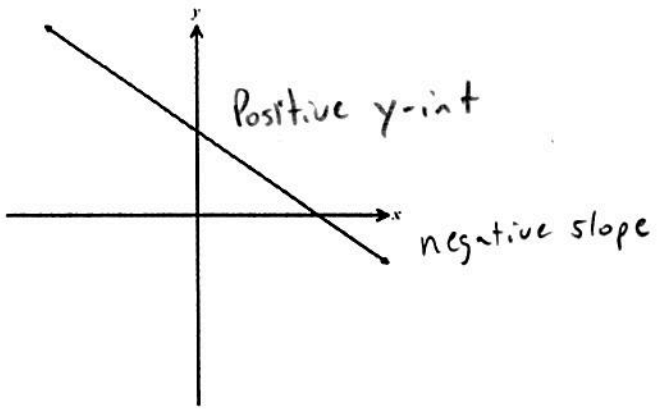
4. Given the line pictured below, which of the following could be its equation?

(1) $y = -\frac{3}{4}x + 8$

(2) $y = 2x - 7$

(3) $y = -\frac{1}{2}x - 4$

(4) $y = \frac{3}{2}x + 1$



5. What is the x-coordinate of the turning point of the parabola $y = 5x^2 + 27x - 3$?

(1) $x = -2.7$ (3) $x = 5.4$

(2) $x = -1.8$ (4) $x = 7.2$

$x = \frac{-b}{2a}$

$x = \frac{-27}{2(5)} = \frac{-27}{10} = -2.7$

6. Which of the following an equation for the line that is parallel to the line $y = 2x - 9$ and passes through the point $(-1, 5)$?

Same slope

Point slope form

(1) $y = -14x - 9$ (3) $y = 2x + 7$

(2) $y = 2x + 5$ (4) $y = -14x + 4$

$y - 5 = 2(x - (-1))$

$y - 5 = 2(x + 1)$

$y - 5 = 2x + 2$

$+5 \quad +5$

$\rightarrow y = 2x + 7$

7. Which of the following is the equation of the inverse of the linear function $y = 4x - 2$?

(1) $y = \frac{1}{4}x + \frac{1}{2}$ (3) $y = -4x + 2$

(2) $y = \frac{1}{4}x + 2$ (4) $y = -\frac{1}{4}x + 8$

$x = 4y - 2$

$x + 2 = 4y$

$\frac{x}{4} + \frac{2}{4} = y$

$\frac{1}{4}x + \frac{1}{2} = y$

8. The parabola $y = 3x^2 - 24x + 55$ can be written in the form

(1) $y = 3(x-2)^2 + 2$ (3) $y = 3(x+2)^2 - 11$

(2) $y = 3(x-8)^2 + 55$ (4) $y = 3(x-4)^2 + 7$

$y = 3(x^2 - 8x + \boxed{16}) + 55 - \boxed{3(16)}$

48

$\frac{-8}{2} = -4$

$(-4)^2 = 16$

$y = 3(x-4)^2 + 7$

9. The graph of a function and the graph of its inverse always have symmetry across

(1) the x-axis (3) the line $y = x$

(2) the y-axis (4) the line $y = -x$

10. A circle whose equation is $x^2+4x+y^2-10y+12=0$ has a center at

(1) $(-2,5)$ (3) $(-4,10)$

(2) $(3,-8)$ (4) $(2,6)$

$x^2+4x+\boxed{4}+y^2-10y+\boxed{25}=-12+\boxed{4}+\boxed{25}$

$(x+2)^2+(y-5)^2=17$

11. A parabola has a focus at $(0,10)$ and a directrix of the x-axis. Which of the following is the equation of the parabola?

(1) $y=x^2+10$ (3) $y=-\frac{1}{5}x^2+5$

(2) $y=\frac{1}{10}x^2+5$ (4) $y=\frac{1}{20}x^2+5$

Distance to directrix = Distance to Focus

$y=\sqrt{(x-0)^2+(y-10)^2}$

$y^2=x^2+y^2-20y+100$

$-y^2+20y=\quad -y^2+20y$

$\frac{20y}{20}=\frac{x^2+100}{20}$

$y=\frac{1}{20}x^2+5$

12. Which of the following is the value of $\sum_{i=2}^{5}(i^2-3)$?

(1) 42 (3) 51

(2) 49 (4) 56

$(2^2-3)+(3^2-3)+(4^2-3)+(5^2-3)$

$1+6+13+22$

42

13. For any value of x, the sum $\sum_{k=0}^{3}k(2x-1)$ is equivalent to

(1) $6x-1$ (3) $12x-6$

(2) $8x-2$ (4) $6x-3$

$0(2x-1)+1(2x-1)+2(2x-1)+3(2x-1)$

$0+2x-1+4x-2+6x-3$

$12x-6$

14. The series $\frac{1}{3}+\frac{1}{2}+\frac{3}{5}+\frac{2}{3}$ can be represented by

(1) $\sum_{k=1}^{4}\frac{1}{k+2}$ (3) $\sum_{k=2}^{5}\frac{k-1}{k+3}$

(2) $\sum_{k=0}^{4}\frac{k+2}{k+3}$ (4) $\sum_{k=3}^{6}\frac{k-2}{k}$

15. Factor the expression below completely.

$$12x^3 + 20x^2 - 3x - 5$$

$4x^2(3x+5) - 1(3x+5)$

$(4x^2-1)(3x+5)$

$\boxed{(2x+1)(2x-1)(3x+5)}$

16. Place the following quadratic function in $y = a(x-h)^2 + k$. Identify the coordinates of its turning point.

$$y = 3x^2 - 12x + 23$$

$y = 3(x^2 - 4x + \boxed{4}) + 23 - \boxed{12}$

$y = 3(x-2)^2 + 11$

$\boxed{TP = (2, 11)}$

17. Write the following in simplest form in terms of x.

$$\sum_{i=2}^{4}(ix+2i) - \sum_{i=0}^{2}(2^i x - 3)$$

$2x+4$ $\quad$ 2^0x-3 $\quad$ $x-3$

$3x+6$ $\quad$ 2^1x-3 $\quad$ $2x-3$

$4x+8$ $\quad$ 2^2x-3 $\quad$ $4x-3$

$9x+18$ $\quad$ $7x-9$

$9x+18-(7x-9)$

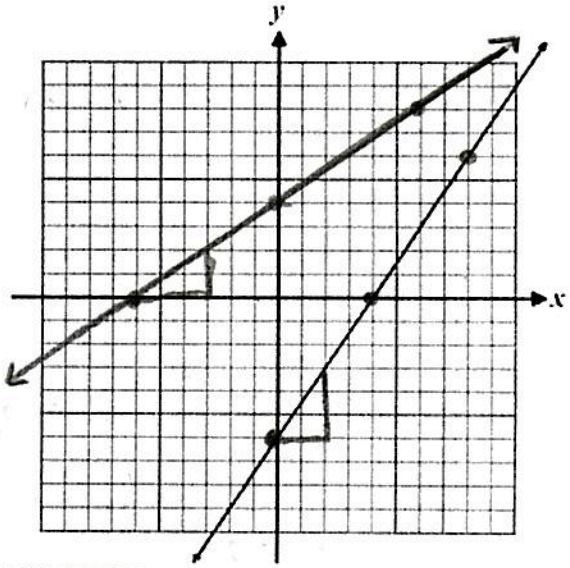
$\boxed{2x+27}$

18. Given the linear graph shown below answer the following questions.

(a) Write the equation of the line in $y = mx + b$ form.

$b = -6$

$m = \frac{3}{2}$ $\quad$ $y = \frac{3}{2}x - 6$



(b) Create a graph of this linear function's inverse on the same set of graph paper.

$(0,-6)$ $\quad$ $(-6,0)$

$(4,0)$ $\quad$ $(0,4)$

$(8,6)$ $\quad$ $(6,8)$

(c) Determine the equation of the inverse.

$y = \frac{3}{2}x - 6$ $\quad \rightarrow \quad x + 6 = \frac{3}{2}y$

$x = \frac{3}{2}y - 6$ $\quad \rightarrow \quad \frac{2}{3}(x+6) = y \quad \rightarrow \quad \boxed{y = \frac{2}{3}x + 4}$

Same slope

19. Selected values of a linear function $f(x)$ are given in the table below. Find the value of k. Explain how you found your answer.

x	−8	−2	4	12	14	18
$f(x)$	−33	−12	9	k	44	58

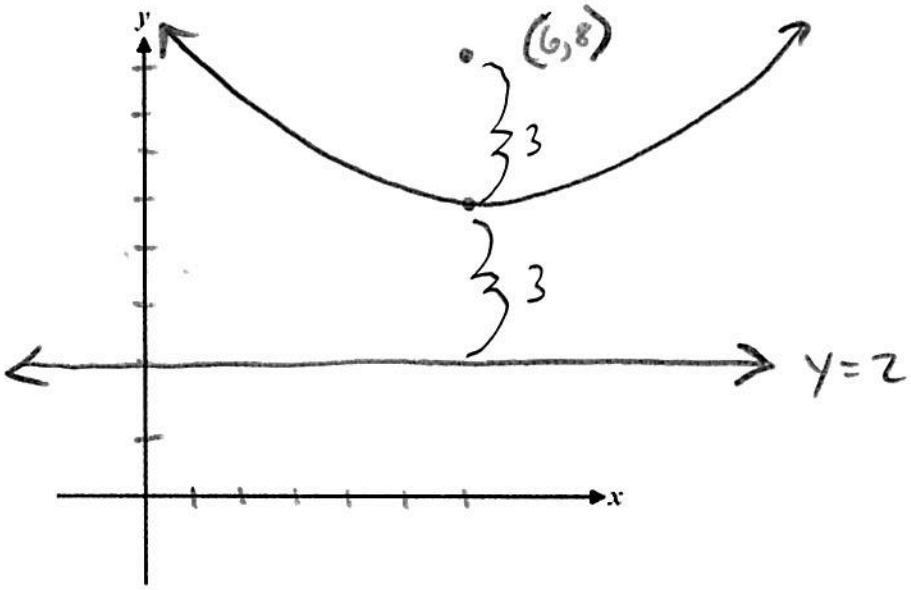
6 21

$k = 37$

$\frac{9-(-12)}{4-(-2)} = \frac{21}{6}$ $\quad \frac{k-9}{12-4} = \frac{21}{6}$ $\quad 6k-54=168$, $+54\ +54$, $6k=222$, $k=37$

20. A parabola has a focus at $(6, 8)$ and a directrix of $y = 2$.

(a) Create a rough sketch of the parabola on the axes below. Label the focus and directrix



(b) What are the coordinates of the vertex of the parabola? Show how you found your answer.

(6,5)

(c) Determine the equation of the parabola using the locus definition of a parabola.

$y-2 = \sqrt{(x-6)^2+(y-8)^2}$

$(y-2)^2 = (x-6)^2+(y-8)^2$

$y^2-4y+4 = x^2-12x+36+y^2-16y+64$

$-y^2+16y-4 \qquad -y^2+16y-4$

$12y = x^2-12x+96$

$\frac{12y}{12} = \frac{x^2}{12} - \frac{12x}{12} + \frac{96}{12}$

$y = \frac{1}{12}x^2 - x + 8$

21. After a recent Arlington High School basketball game, traffic was exiting the parking lot at a constant rate of 28 cars per minute. The parking lot started with 922 cars. How many cars are still in the parking lot after 10 minutes?

$\frac{28}{1} = \frac{x}{10}$

$280 = x$

$922 - 280 = \boxed{642}$

22. Solve the following system of equations algebraically.

$3(8x - 2y = 5)$
$2(-12x + 3y = 7)$ →

$24x - 6y = 15$
$-24x + 6y = 14$

$0 + 0 = 29$

$0 = 29$

↑ Not True

No Solution

23. Which has the greater average rate of change over the interval $-3 \le x \le 4$, the function $g(x) = 3x^2$ or the function $f(x) = 2x + 7$?

$g(4) = 3(4)^2 = 48$

$g(-3) = 3(-3)^2 = 27$

$\frac{48 - 27}{4 - -3} = \frac{21}{7} = 3$

$f(x)$ is a line therefore the rate of change is always 2

$g(x)$ has a greater rate of change

24. Solve the following system of equations algebraically.

$$3x-5y+2z=-5$$
$$5x+y+6z=33$$
$$-2x+10y-3z=40$$

Use ① and ② eliminate y

$3x-5y+2z=-5$
$5(5x+y+6z=33)$ → $3x-5y+2z=-5$, $25x+5y+30z=165$

④ $28x+32z=160$

Use ① and ③ eliminate y

$2(3x-5y+2z=-5)$ → $6x-10y+4z=-10$
$-2x+10y-3z=40$ → $-2x+10y-3z=40$

⑤ $4x+z=30$

use ④ and ⑤ eliminate x

$28x+32z=160$
$-7(4x+z=30)$ → $28x+32z=160$, $-28x-7z=-210$

$\frac{25z}{25}=\frac{-50}{25}$

$z=-2$

Find x:

$4x+(-2)=30$

$\frac{4x}{4}=\frac{32}{4}$

$x=8$

Find y:

$5(8)+y+6(-2)=33$
$40+y-12=33$
$28+y=33$
$y=5$

$(8, 5, -2)$

25. Solve the following system of equations algebraically.

$$x-2y+3z=1$$
$$x+2y-z=13$$
$$3x+2y-5z=3$$

Use ① and ② eliminate y

$x-2y+3z=1$
⊕ $x+2y-z=13$

④ $2x+2z=14$

Use ① and ③ eliminate y

$x-2y+3z=1$
⊕ $3x+2y-5z=3$

⑤ $4x-2z=4$

use ④ and ⑤ eliminate z

$2x+2z=14$
⊕ $4x-2z=4$

$\frac{6x}{6}=\frac{18}{6}$

$x=3$

Find z:

$2(3)+2z=14$
$6+2z=14$
$2z=8$
$z=4$

Find y:

$(3)-2y+3(4)=1$
$3-2y+12=1$
$15-2y=1$
$-15 \quad -15$

$\frac{-2y}{-2}=\frac{-14}{-2}$

$y=7$

$(3, 7, 4)$